MILLTOWN DAM EDUCATION PILOT PROJECT
April 10, 2006

ABSTRACT

The Watershed Education Network (WEN), in collaboration with natural resource experts (NRDP, EPA, FW&P, CFRTAC, FOTR, and Missoula-City County Water Quality District) will create a curriculum and field trip program for Missoula-area eighth grade students and their teachers. WEN is seeking funding for the development of an education-based **Milltown Dam Pilot Project (MDPP)** that will expand student learning of local current events and promote understanding of Clark Fork River history, the removal of Milltown Dam, remediation activities and river restoration processes to be completed in the near future three miles upstream from Missoula.

The removal of the Milltown Dam is monumental, and its legacy—of both its existence and dismantling—is bound for history books. As the watershed education hub of the greater Missoula area, WEN must take advantage of this unique opportunity and involve and educate our local community. As such, we propose a pilot education project with 4 Missoula-area 8th-graclasses, repeated fall 2006 and spring 2007—for a total of 8 classes (averaging 24 students each) participating in the MDPP, approximately 200 future citizens and stewards. Unbelievably, local students and teachers are not well-informed of the Clark Fork River history or current remediation and restoration activities planned at Milltown Dam in conjunction with the dam removal slated to begin as early as fall of 2006.

Through the MDPP the students and teachers will learn about the Clark Fork River history, the upstream history and resulting effects on the environment of historical mining activities, the dam's construction and uses, proposed dam removal process, and stay informed of the remediation and restoration projects slated for the next 10 years near Milltown.

The overall goal of the proposed Milltown Dam Pilot Project (MDPP) is to educate students and teachers in the Missoula area about their local environment, so they can learn more about the place they live, and especially the work being done for remediation and restoration of the Clark Fork River that is theirs to steward in the future. Education about where students live or "sense of place" provides students with an opportunity to connect to the past, current and future Clark Fork River human interactions and have a better understanding of work being done to protect human and environmental health as well the steps being taken to restore the river in their backyard. Students will be encouraged to become informed stewards of the Clark Fork.

Relying on expertise from agency personnel closely working with the Milltown Dam remediation and restoration process for accurate information, WEN staff will develop curriculum and informative, age-appropriate presentations. These Milltown Dam class presentations will be supplemented by field trips to Milltown Dam with resource experts as field trip guides during which students can visit the Milltown Dam area (sometimes for their first time) and *see* the Milltown Dam remediation and restoration process. This Milltown Dam Pilot Project will lay the groundwork for a future, long-term education program, *The Milltown Dam Education Program*, to be implemented throughout Missoula-area eighth grade classes from 2007 through 2010.

The driving force of this project is the recent (Dec.20, 2004) Environmental Protection Agency (EPA) Record of Decision (ROD) to remove the Milltown Dam in the next six to ten years. Because of this approaching timeline for remediation and restoration activities, our project should begin *as soon as possible* to complement the dam removal, remediation and restoration activities. By getting teachers and students informed and participating in their backyard river clean-up *now*, students can observe the remediation and restoration activities as they take place. And because this is a pilot project, feedback from those involved—natural resource professionals, agency personnel, teachers and students—will evaluate the curriculum and field trip pieces most relevant, effective and engaging, which will then serve as the foundation of the *Milltown Dam Education Program* curriculum. Our aim is to pique interest and facilitate the teaching of students about their local river system, natural history, and a topic that will surely be a part of their academic and personal future.

Goals:

1) Develop key curriculum pieces with agency and resource expert guidance, using accurate information to shape and instruct the MDPP. These experts will also be invited to be key presenters of every field trip: Natural Resource Damage Program (NRDP), Environmental Protection Agency (EPA), and Montana Fish Wildlife and Parks (MFWP), Clark Fork Watershed Education Project (CFWEP), Missoula City-County Water Quality District (MCWQD), Clark Fork Coalition (CFC), Friends of Two Rivers (FOTR), and the Clark Fork Technical Advisory Committee (CFRTAC).

2) Coordinate schedules with teachers from participating Missoula-area classes to launch the *Milltown Dam Pilot Project*. Target schools include Bonner Elementary, Target Range Elementary, C.S.Porter and Washington Middle School. The target grade level for the participation in the Pilot Project is 8th grade, with consideration given to the complex nature of the Clark Fork River and Milltown Dam history and current proposed clean-up activities.

3) Administer pre-tests to the students and teachers of four 8th grade classes to assess prior knowledge and perceptions;

4) Coordinate classroom presentations, featuring history and science of the Milltown Dam and Reservoir, using material, maps and timelines compiled by the resource experts listed above;

5) Arrange for agency experts to participate in class presentations and Milltown Dam field trips, above and below the spillway, creating an informative field trip to the site by the participating students and teachers: Clark Fork Watershed Education Project (CFWEP), Missoula City-County Water Quality District (MWQD), Clark Fork Coalition (CFC), Friends of Two Rivers (FOTR), Clark Fork Technical Advisory Committee (CFRTAC), Natural Resource Damage Program (NRDP), Environmental Protection Agency (EPA), and Montana Fish Wildlife and Parks (MFWP).

6) Schedule field trips to the Milltown Dam site with the participating classes and appropriate resource experts;

7) Provide post-field trip presentations to review field trip content and discuss student observations;

8) Administer a post-tests during a second classroom visit in order to assess the quantity and quality of information imparted; gauging the information gained, and perceptions changed;

9) Coordinate public relations and media opportunities to highlight local student and teacher participation in learning about the Milltown Dam removal, remediation and restoration process; and,

10) Evaluate and revise the MDPP curriculum and field trip components based on any recommended changes (from experts and teachers) from the Milltown Dam Pilot Project and develop the draft curriculum for *The Milltown Dam Education Program* (expanded four year program 2007-2011 to follow the remediation and restoration activities).

General Timeline: Planning the curriculum and field trips around the current Milltown Dam activities is critical—because the MDPP seeks to educate and involve local communities in the multi-step processes of dam removal, remediation, and restoration, timing and coordination must align as best it can with the scheduled Milltown Dam removal plans. This is a bit of a moving target, so WEN staff will continue to stay in close communication with the appropriate officials for all of the Milltown Dam timeline changes they occur and make adjustments to our schedule. Ideally, the project will span two phases: 1) the *Milltown Dam Pilot Project*, for eight classes (four in the fall, four in the spring) which we are currently seeking funding to begin September 2006 and run through July 2007; and 2) a subsequent four-year *Milltown Dam Education Program*, expanding the program to include 12 eighth grade classes per year, participating in the Milltown Dam Education Program from 2007 to 2011 for a total of 1,200 students.

Specific Timeline

Phase I: Milltown Dam Education Pilot Project August 2006-July 2007

July 2006

1) Select four Missoula classes for participation in the Milltown Dam Pilot Project (MDPP);
2) Meet with agencies and resource experts to assist WEN in determining the Clark Fork River and Milltown Dam education outcome goals for the participating students and teachers;
3) Compile and create accurate, age-appropriate Milltown Dam and Clark Fork River curriculum to be presented to the participating eighth grade classes (2 lessons); develop a curriculum that follows dam removal remediation and river restoration activities;

August – November 2006

4) Create "Pre-tests" and Post -tests" to survey and test student knowledge before and after the MDPP
5) Administer the Milltown Dam pre-tests to the MDPP classes
6) Secure access for students and teachers to the Milltown Dam Superfund Site through appropriate key project officials and agency personnel
7) Coordinate and schedule field trips to Milltown Dam area with WEN staff, teachers, the bus company, and Milltown Dam resource experts
8) Facilitate Milltown Dam field trips (photo documentation, data collection, on site learning activities)

December 2006 – January 2007

9) Arrange for the classes to have a "Post-field trip" lesson (summary) and "Post-field trip" tests
11) Evaluate MDPP class presentation material and the field trip experience by sending detailed evaluation forms to teachers and resource experts
12) Evaluate overall effectiveness of MDPP; make any adjustments for spring Milltown Dam Pilot Project;
13) Begin draft the 2007-2011 *Milltown Dam Education Program* for the 2007 Natural Resource Damage Program Large Grant application

February - March 2007
Repeat the fall 2006 program, with recommended changes from evaluations –

1) Select 4 Missoula classes for participation in the Pilot Project
2) Meet with agencies and resource experts to assist WEN in determining the key Clark Fork River and Milltown Dam education outcome goals for the participating students and teachers;
3) Compile and create accurate, age-appropriate Milltown Dam and Clark Fork River curriculum to be presented to the participating eighth grade classes (2 lessons); develop a curriculum that follows dam removal remediation and river restoration activities; Determine the education outcome goals for the participating students and teachers
4) Create "Pre-tests and Post-tests for the participating students to survey and test student knowledge before and after the MDPP
5) Administer the Milltown Dam pre-tests to the MDPP classes

April – June 2007
6) Secure access for students and teachers to the Milltown Dam Superfund Site through appropriate key project officials and agency personnel
7) Coordinate and schedule field trips to Milltown Dam area with WEN staff, teachers, the bus company, and Milltown Dam resource experts
8) Facilitate Milltown Dam field trips (photo documentation, data collection, on site learning activities)
9) Deliver "Post-field trip" lesson (summary) and "Post-field trip" tests
10) Evaluate MDPP through questionnaire to teachers and resource experts
11) Evaluate overall effectiveness of MDPP; make any adjustments for spring Milltown Dam Pilot Project;
13) Presentation with MDPP results to NRDP for 2007-2011 *Milltown Dam Education Program* for the 2007 Natural Resource Damage Program Large Grant application

14) Finalize all curriculum, field trip components from MDPP for integration into the *Milltown Dam Education Program*

*August 2007 would begin the Phase II – *The Milltown Dam Education Program*

This MDPP we are seeking funding for sets the stage for an expanded, four –year Phase II *Milltown Dam Education Program* beginning in the fall of 2007. This would ensure that Missoula students learned about the Milltown Dam removal, remediation and river restoration as it is taking place. A high quality program will be ensured with the evaluation results from the pilot will shaping Phase II - *Milltown Dam Education Program.* Six classes each fall and six each spring (approximately 300) eighth grade students from Missoula

schools each year will participate in phase II for a total of 1,200 students participating in the learning opportunity of Milltown Dam during this crucial time. The pre-test and post-test system will assess student knowledge of Milltown Dam's history and removal. These test results and project evaluations from resource experts and teachers will tailor the four-year program in Phase II to meet educational goals and community needs. The Phase II *Milltown Dam Education Program* is designed to provide local teachers and students with needed classroom and field trip instruction to follow the Milltown Dam removal and river restoration process.

The Phase II *Education Program* will provide: a) teacher curriculum featuring the Clark Fork basin and Milltown Dam history, dam removal plans, remediation processes and restoration activities; b) productive and accurate class presentations and lesson plans teaching specific concepts of the Milltown Dam history, Superfund process, and Milltown Dam removal and restoration plans. c) Student field trips planned with resource experts to follow the process of the Milltown Dam removal, remediation, and restoration process; d) Community celebrations featuring student presentations.

Funding for this initial Pilot Project would enable WEN to collaborate with the resource experts, coordinate with the teachers and schools, and create the curriculum and field trip details to build a foundation for the *Milltown Dam Education Program.* We will test the curriculum and lessons we compile, gain a clear understanding of what topics, materials and field trip experiences are best suited for students, and tailor the eventual *Education Program* to meet the resource expert, students, and teacher recommended pieces and what is best suited for the occurring Milltown Dam processes on the ground.

Key Players:

WEN Staff will facilitate the project components from August 2006 through July 2007. Deb Fassnacht, Sean Sullivan, and Brooke Hewes will coordinate all aspects of the project: communicate with all the participants, gather information and materials, develop and implement pre-and post-tests, meet with resource experts of the Clark Fork River and the Milltown Dam; facilitate class presentations and field trips; and finally, based on test results and evaluations, plan and design the future four-year education program to begin with preliminary dam removal activities slated to begin in 2007.

Resource Experts will actively participate in curriculum review, guide field trips to Milltown Dam, and provide project evaluations. Peter Nielsen, (Missoula WQD and CFRTAC); Russ Forba, Diana Hammer (EPA), Keith Large (DEQ), Doug Martin (NRDP), Pat Saffel and David Smetterling (FW&P), Judy and Gary Matson, Friends of Two Rivers (FOTR) and Milltown Redevelopment Working Group, and Christine Brick, Clark Fork Coalition (CFC).

Missoula –area public schools: teachers, administrators, and eighth grade classes from 4 Missoula schools in fall 2006 and 4 Missoula classes in spring 2007 will be the focus of this educational project. Eventually, the *Phase II Milltown Education Program* would reach 12 eighth grade classes the Missoula area each year. The Phase II Milltown Dam Program would be offered every fall and spring to 6 eighth grade classes so that each year approximately half of the public school 8th grade students would tour the Milltown Dam and participate in the educational program. Through the course of our four-year *Phase II Milltown Education Program,* we will reach all of these eighth classes two times. This Phase II, long-term program has the potential to

reach 300 students per year for a total of over 1,200 students participating over the four-year Milltown Dam Education Program.

WEN staff and volunteers will continue to work collaboratively with school teachers, administrators, and Clark Fork River/Milltown Dam resource experts. We will also coordinate with the following educational activities currently being conducted in the Upper Clark Fork River Basin**:** The Clark Fork Watershed Education Project (CFWEP), Montana Watercourse's Clark Fork Teaching Trunk, the Blackfoot Challenge, and the University of Montana's Science Education Partnership Award (SEPA). Other local groups will be consulted, including the Friends of Two Rivers, the Milltown Redevelopment Group, the Missoula City-County Water Quality District, Mountain Water, and Montana Fish, Wildlife and Parks.

STEP 3: TECHNICAL NARRATIVE
A. Project Need

1. Problem Description

At the western end point of the upper Clark Fork Superfund complex sits the Milltown Dam. The Milltown Dam180-acre reservoir contains 6.6 million tons of accumulated toxic sediment, laden with metals and mine tailings washed down from Butte's copper mines. Just three miles downstream of this massive reservoir of contamination, is Missoula, Montana. The teachers and students in the Missoula area are in need of accurate, up-to-date information on the Milltown Dam project. There is a special window of opportunity for learning about Milltown while the entire process is taking place.

Tuesday, August 2, 2005, EPA and the US Department of Justice announced at a press conference held at the Milltown Dam that the Atlantic Richfield Company and NorthWestern Corporation have agreed to complete a $100 million-plus cleanup of the Milltown Reservoir. This agreement or Consent Decree is the result of over three years of negotiations among EPA, DOJ, the State of Montana, the Confederated Salish and Kootenai Tribes, Atlantic Richfield and NorthWestern.

The Consent Decree is the final agreement in the long process of study that led to selection of a remedy. The Selected Remedy was published in a Record of Decision in December 2004. This remedy is remarkable in many ways, merging remediation and restoration and laying the groundwork for future development. Area residents, the local government, and many other stakeholders have been and will continue to be actively involved in the future of the confluence of the Clark Fork and Blackfoot rivers in western Montana.

EPA's selected remedy for the Milltown Superfund Site addresses contamination from more than a century of mine waste washing downstream, creating some 6.6 million cubic yards of contaminated reservoir sediments. Those sediments have polluted the local drinking water supply and threaten the local fishery. The remedy described in the *Record of Decision* provides many benefits: 1.Permanent, long-term protection of public health and the environment, 2. Recovery of the Milltown drinking water supply, 3. Use of existing waste management areas for waste disposal, 4.Substantial elimination of contaminant release from ice-scouring and catastrophic events, 5. Return of two major waterways (the Clark Fork and Blackfoot rivers) to a free-flowing state, 6. Unrestricted fish passage, 7. Substantial improvement in the native and recreational fisheries, especially for trout, and 8.Redevelopment possibilities for the area

* Above information summarized from the Department of Environmental Quality sources.

The EPA's formal *Record of Decision* and Selected Remedy calls for removal of the most contaminated reservoir sediments and the source of the arsenic that pollutes Milltown's aquifer – and the disposal of those sediments in the tailings ponds 100 miles upstream in Opportunity, Montana. The EPA plan to remove Milltown Dam and the contaminated sediments behind the dam beginning in 2006 presents a unique learning opportunity for both Missoula area students and teachers - they will be able to see, first-hand, the removal of a dam, remediation and restoration of a river.

Work at Milltown Reservoir will begin this winter, with removal of the dam as early as January 2006. Then will come the excavation of 2.6 million cubic yards of contaminated reservoir sediments. Within seven years, the cleanup will be complete and the free-flowing confluence of the Clark Fork and Blackfoot rivers-blocked by Milltown Dam since 1908 – will be restored. This is best described by John Wardell, director or EPA's Montana field office in the *Missoulian* article, Dec. 21, 2004, "It's been a long journey…this is an exciting and I think, the best decision. It offers all sorts of opportunities for people in Milltown…Missoula and western Montana." Chuck Erickson, president of Friends of Two Rivers, a group of Milltown and Bonner residents also in the same *Missoulian* article, "A lot of people thought this would never happen in their lifetimes."

WEN will serve as the facilitator and be the liaison between the government officials, agency personnel, local experts, and the schools to provide readily-available, comprehensive information, and organize field trips to the Milltown Dam site. This will provide the students living in the Clark Fork River basin with a once-in-a-lifetime chance to observe the Remedy process, with resource experts on hand to ensure they fully understand it and take part in this historical event.

Therefore, there are three accomplishments we are hopeful the Milltown Dam Pilot Project (MDPP) will address:
1) Facilitate balanced, science-based education regarding history of the Clark Fork River, Superfund remediation with restoration activities, the step-by-step plan for these activities, along with the obvious Milltown Dam removal process - as well as why these processes are necessary to the long-term health of the ecosystem;
2) Provide opportunities for field trips and direct observations by local students in dam removal and river restoration activities.
3) Quality curriculum with natural resource expert participation for students to learn about the dam's history, follow the four-year process of dam removal, and study the long-term benefits of the remediation and restoration to the Clark Fork River basin.

B. Project Goals and Objectives

1. Goals

The goal of this Phase I –*Milltown Dam Pilot Project* (Pilot Project) is to plan and develop a long-term, education program that fosters understanding and stewardship of the Clark Fork River by actively involving students, teachers and local communities in the Milltown remediation and river restoration processes which will be taking place over the next four years.

2. Objectives

We will accomplish this goal through these Milltown Dam Pilot Project objectives:

1. Develop a Clark Fork River/Milltown Dam specific-curriculum that is age appropriate and utilizes materials and activities available through the basin's natural resource agencies (EPA, DEQ, NRDP, FW&P, CFRTAC and other organizations such as CFWEP and FOTR).

2. Maximize resource expert recommendations for specific concepts, information, and teaching resources for to be included in the MDPP.

3. Actively involve resource experts and agency personnel throughout the Pilot Project

4. Ensure high quality curriculum and field trip experience throughout the project by comprehensive evaluating curriculum and educational experiences; aligning the curriculum and field trip activities with Montana Science and Social Studies Teaching Standards.

5. Provide comprehensive, balanced education using an inclusive, collaborative approach – while maintaining an awareness and understanding of the complex nature of this topic.

6. Complimenting and coordinating activities with the Montana Tech-based CFWEP *Summer Teacher Science Academy* and their Clark Fork River programs and activities to facilitate a basin-wide comprehensive study of the ongoing work to improve the river along the entire stretch from Butte to Missoula.

7. Remain vigilant and responsive to Selected Remedy, Statement of Work and the State's Restoration Plan schedule changes as the progress at the Milltown Superfund Site may change due to unforeseen circumstances.

3. Quantitative results

A. Survey Outcomes/Reports: A pre-test/post-test system will be implemented in this Pilot Project. The tests will assess the level of knowledge and understanding of the students and teachers before the Milltown Dam Education Pilot Project is implemented and dam-related education provided ("pre-tests") and then again when the Pilot Project is completed and dam-related education has been conducted ("post-tests). The test results will be compiled and used, in conjunction with the evaluation of the Pilot Project, to shape the Phase II *Milltown Dam Education Program* – a long term study of the Milltown Dam removal and restoration process.

Based on our survey results, we expect to show clear improvements in student knowledge of the Clark Fork River and Milltown history, remediation and restoration processes. Specifically we intend to show: 200 Missoula area school students in grade eight; 6 -8 Missoula area school teachers, and 6 Missoula area school administrators will demonstrate 45% increase in knowledge of the Milltown Dam history, remediation, and river restoration project by their scores on the pre-tests and post-tests.

B. Milltown Dam and Clark Fork River History, Remediation, and Restoration Curriculum: WEN staff, with resource expert guidance, will design 2-3 lesson plans specific to the Milltown Dam and Clark Fork River history, and river ecology as it relates to the Milltown Dam Consent Decree, Selected Remedy and the remediation and restoration processes to follow the EPA and State of Montana Natural Resource Damage Program's process over the next several years.

Draft Curriculum

1. History of the Clark Fork River
Provide a brief overview of the Clark Fork Basin history to connect Milltown Remedy to the upper Clark Fork River remediation and restoration activities. (Resources: *the Upper Clark Fork Basin Multi-Media Project CD-Rom* and other available resources from EPA, DEQ, NRDP and CFWEP)

2. Milltown Dam History through the current situation

Introduce the historical events of the Milltown Dam through the large, colorful timeline and set of cards with various events and activities. Students then match the event they read aloud with the date on the timeline for a graphic and memorable introduction to the century of events in the watershed.

Using power point and historical photographs create an engaging presentation to highlight the following information provided by the Clark Fork Technical Advisory Committee:

More than 100 years of mining, milling and smelting produced contaminated sediments that ended up in the Milltown Reservoir. These sediments, containing heavy metals and arsenic, have contaminated the underlying aquifer. They also may be released into the lower Clark Fork River during flooding and ice scouring events.

The site covers 820 acres in Milltown. Missoula, a major population center, is directly downstream of the dam and reservoir. Community concern comes largely from the Missoula area.

BACKGROUND
In 1906 a hydroelectric dam was constructed, forming a reservoir that trapped sediments from mining, milling and smelting operations in the Upper Clark Fork Valley. During the years since the construction, the reservoir storage has been nearly filled with approximately 120 million cubic feet of sediments.

Approximately 91 people live within one half mile of the site. The nearest house is 100 meters away. The site is adjacent to the Milltown Dam, where the Big Blackfoot River joins the Clark Fork River. The rivers are used for recreational activities.

RESIDENTS USED BOTTLED WATER
In 1981, Milltown's four community water supply wells, serving 33 residences, were found to be contaminated with arsenic and other heavy metals. Residents were advised not to use this water for drinking or cooking and to use alternative supplies of water. The Environmental Protection Agency (EPA) and the State of Montana obtained a different domestic water supply for the residents affected by contaminated drinking water.

Ground water and sediment contaminants include arsenic and manganese. The Clark Fork River and Milltown Reservoir contain elevated levels of copper, arsenic, zinc and cadmium. An alternative water supply has been provided, and contaminated wells have been taken out of service. Residents, therefore,

have little chance of exposure to contaminants by drinking ground water. Metals laden sediments released from the reservoir continue to pose a risk to a downstream fishery.

EPA added the site to its National Priorities List (NPL) in September 1983. The site is being addressed through the combined actions of federal and state agencies and the Potentially Responsible Parties (PRPs).

CLEANUP CONDUCTED IN STAGES

The site is being addressed in four stages: an initial action and three long-term cleanup phases. The latter phases focus on the water supply, sediment source control, and the Clark Fork River.

In 1983, volunteers using National Guard equipment supplied residences with door-to-door water service on a biweekly basis for three months.

In 1984, EPA selected a remedy to cleanup the Milltown water supply by:

Digging a new well from a separate aquifer;
Constructing a new distribution system;
Flushing the plumbing system of each house to remove contaminants from the water system and plumbing; and
Testing the water quality to ensure standards have been met.

In 1985, EPA added a supplemental remedy, which included replacement of household water supply equipment that remained a source of contamination, as well as continued sampling of individual residences to ensure the sources of contamination had been removed. The state completed the new water supply system and the installation of household water equipment, also in 1985.

In 1989, EPA completed a study on the effects of the contamination downstream from the reservoir. Preliminary results show no environmental damage. However, the sediment investigation will continue to ensure that there is no human health or environmental threat.

CONTAMINATION STUDY

EPA and Atlantic Richfield Company (Arco), a PRP, signed an Administrative Order on Consent (and subsequent amendments), under which Arco agreed to study the extent of site contamination. The study was completed in 1995. EPA also conducted a separate Human Health and Ecological Risk Assessment in consultation with an advisory committee, which included representatives from the public and the Potentially Responsible Parties.

EPA and Arco initiated the Feasibility Study in 1995 to determine groundwater cleanup. In early 1996, an unusually wet winter and early thaw led to an ice scouring event, which churned up river and reservoir sediments. The draft Feasibility Study for the contaminated ground water was placed on hold pending further study of the impacts of the ice scouring. After public discussion, the local government asked EPA to delay choosing a final remedy for the impacted ground water and instead to combine it with a decision addressing the impact of "continued releases" of sediments on the downstream fishery. EPA produced an Ecological Risk Assessment Addendum for the issue of continued releases over the Mill town Dam. The addendum was released to the public and Arco on April 15, 2000, and a public meeting was held in May to discuss the findings and receive public reaction.

ENVIRONMENTAL PROGRESS

The construction of new water supply wells and the replacement of household water supply equipment have provided a safe drinking water supply to affected residents, significantly reducing the potential

health threats from contaminated ground water while investigations leading to cleanup of the sources of contamination continue at the site.

RIVER OPERABLE UNIT PROGRESSES
In 1992; EPA designated the Clark Fork River, from the outlet of Warm Springs Ponds (see Silver Bow Creek/Butte Area site) to upstream of the Milltown Reservoir, as part of the site.

An investigation into the nature and extent of contamination of the Clark Fork River began in 1995. A Remedial Investigation report is complete and available for review. EPA released a human health risk assessment in March 1998 that concluded risks to human health were minimal, except in specific areas of the flood plain and old irrigation channels that for the most part are uninhabited. The ecological risk assessment was released in December 1999, and public meetings were held in early 2000. EPA is currently responding to comments received from the general public and Arco on the risk assessment. The feasibility study is ongoing, and a ROD is scheduled for late 2001.

An extensive study of the geomorphology of the river resulted in eleven documents which are available online or from EPA.

Through its Technical Assistance Grants (TAG) program, EPA funds the Clark Fork River Technical Assistance Committee (formerly the Milltown TAC) to review the results of EPA studies and to relay these findings to the community.

* Information provided from CFRTAC on-line resources.

The curriculum will be based on accurate information from agencies and official sources to focus on: highlighting historical condition of the river, the changes that have occurred in the river system over time from events of the past, specifically mining activity in the headwaters, Superfund activities of the past and slated for the area immediately, and discussions of the Milltown Dam and Clark Fork current situation.

We will incorporate numerous existing curriculum and resources such as The Upper Clark Fork Teaching Trunk, CFWEP's curriculum, NRDP information sources. WEN will work collaboratively with Clark Fork Watershed Education Project (CFWEP), Natural Resource Damage Program, USGS, EPA, Envirocon, Clark Fork Technical Advisory Committee, Missoula Water Quality Advisory Committee, Missoula County and Water Quality District, Friends of Two Rivers, Blackfoot Challenge, Montana Fish Wildlife and Parks, and Milltown Re-development Group to use existing resources and avoid any duplication of efforts.

Specifically, WEN will incorporate the teaching materials in the Milltown Dam Education Pilot Project and make these resources available to the teachers:

Clark Fork Watershed Education Project (CFWEP) materials, developed lessons, activities and field trip locations;
Upper Clark Fork Teaching Trunk (Montana Watercourse) including the following concepts in class presentations and field trips:
1) Interactive CD-Rom of Butte and Anaconda's historical mining history;
2) Clark Fork River history: flood of 1908 and mine tailings washing downstream to settle behind Milltown Dam;
3) Natural Resource damages in the watershed (fisheries, groundwater, water quality, heavy metals contamination in rivers and streams);

4) Superfund Law and Montana's Upper Clark Fork River Basin Natural Resource Damage Litigation and Restoration; distinction between remediation and restoration of resources;
5) Clean-up process of Silver Bow Creek, Butte, and Warm Springs areas
6) EPA's Milltown Dam and reservoir clean-up alternatives, decision-making process and recent Record of Decision (ROD);
7) Milltown Redevelopment Working Group's process and plans for the restored confluence of the Blackfoot and Clark Fork Rivers;
8) Ongoing stewardship of the Clark Fork River: MT. Fish, Wildlife and Parks, Missoula Water Quality District, Volunteer Nutrient Reduction Program (VNRP State of Montana Department of Environmental Quality (DEQ).

C. Class Presentations: WEN staff or agency resource experts will provide background information on the Clark Fork River history, Milltown Dam history, remediation work and restoration plans for the Clark Fork River in two 50 minute class presentations. Agency experts, maps, diagrams from NRDP, EPA, CFRTAC, FOTR, and State FWP will provide guidance, information and expertise to these presentations.

D. Field Trip Agendas and Summaries: WEN staff will create field trip scripts for use by the key resource experts for summarize and evaluate each field trip to the Milltown Dam; provide photo documentation, and participant evaluations. Resource experts who accompany students on the field trips will provide written feedback in their *field trip summaries.* In addition, WEN will provide results from each of the Pilot Project activities:

- Student surveys, pre and post the Pilot Project curriculum and field trips
- 2 Lessons on the Milltown Dam and Clark Fork Rivers
- Missoula-area school teacher evaluations and recommendations
- Program evaluation by the WEN staff and resource experts who participate in class presentations and field trips.

C: Project Implementation Plan

a. Overall approach

Watershed Education Network (WEN) staff will bring their teaching experience, watershed education programs, and balanced, scientific approach to the Milltown Dam Pilot Project by serving as Project Coordinators, facilitating the Pilot Project objectives to ensure program success.

We will use written tests to assess the education program effectiveness. Our pre- and post-tests of the students will serve as baseline data of what information and perceptions of the Milltown Dam are prior to our activities, then we will monitor our program's success by testing for knowledge after our Milltown Dam Pilot Project has been implemented. We will continue to revise and refine our curriculum concepts based on these test results and comprehensive evaluations by the participating teachers and resource personnel.

Background
WEN's Milltown Dam Pilot 2005

As soon as the EPA announcement of the *Record of Decision* was made, The Watershed Education Network began planning how to ensure local students were able to learn about the Milltown Dam history and current events while it was taking place in their backyard. WEN staff was determined to pilot an education project in the fall of 2005, even though we were not funded to do so. WEN contacted the following agencies: Missoula Water Quality District, CFRTAC, Friends of Two Rivers, Montana Fish Wildlife and Parks, Clark Fork Coalition, and Milltown Redevelopment Working Group. These agency personnel assisted with the development of a base curriculum for students to have information presented to them in class, prior to a field trip to view the site. See copies of student written responses after the Milltown Dam field trip. (Appendix 16)

Schedule of WEN's Fall 2005 Milltown Pilot Classes

Date	School	Event
Nov. 2 and 3	Washington Middle School	Class presentations
Nov. 4	Washington Middle School	Milltown field trip
Nov. 16 and 17	Target Range School	Class presentations
Nov. 21	Target Range School	Milltown field trip
Nov. 30	Bonner School	Class Presentation

During the fall 2005 Milltown Pilot Project, WEN focused on the target audience of eighth grade students in the Missoula area. Two class periods, or equivalent block schedule, were used to educate the students about the history and environmental health (human and aquatic life) concepts surrounding Milltown Dam and the Clark Fork River Watershed.

Class Period ONE: 50 min.

Students are pre-tested using a knowledge survey developed by the Watershed Education Network (copy of pre-test on Appendix 15) to assist WEN in the evaluation of the programs goals. Pre-tests also serve as a jumpstart into the curriculum automatically making students access their previous knowledge of the Clark Fork river issues and history of the Milltown Dam .(10min)

Activity One: Milltown Dam History Time line (25 Min)

- Students are handed cards with dates and information about the Milltown Dam. Students are asked who thinks they have the oldest date. Then students piece together the history of the watershed and the Dam through publicly reading the cards provided and placing them in the correct spot on the timeline provided.
- Goals: engage students in a hands-on history lesson of the Milltown Dam and the Upper Clark Fork watershed. Students acquire an awareness of the mining history and the resulting Milltown Dam bringing them to current time and the removal of Milltown Dam.

Activity Two: Milltown Dam PowerPoint slideshow. (20 Min.)

The Watershed Education Network in collaboration with local experts (CFRTAC) compiled information and images to create a PowerPoint slide show of information and pictures allowing

the students to visually see evidence of mining history and the resulting damage to the Clark Fork River.
Key Terms outlined and defined:

- Watershed; Specifically Clark Fork River Superfund Sites
- Superfund, and CERCLA acts defined
- Groundwater; surface water interactions pertaining to mining activities
- Open Pit mining
- "Slickens"- Bed load , and suspended loads/ sediment deposition
- Remediation; and responsible parties
- Restoration; and responsible parties

Activity three: Science Lesson from Upper Clark Fork Teaching Trunk
Lesson 2: **Cookie Mining** Lesson adaptation by Greg Grallo, teacher

Correlations to Montana Science Standards

Content 1: Students design, conduct evaluate and communicate scientific investigations
Benchmarks: 2, 5
Content 5: Students understand how scientific knowledge and technological developments impact society.
Benchmarks: 1, 2, 3, 4.
Content 6: Students understand historical developments in science and technology.
Benchmarks: 1, 2

Class size: 25 students
Time: 1-2 class periods
Grade: 6-8
Goal: Students will compare and contrast mining reclamation vs. mining restoration and gain a greater appreciation for what the Natural Resources Damage Program and the Environmental Protection Agency are doing in the Clark Fork River Watershed.

Objective: Students will be able to explain the difference between restoration and reclamation.

Materials: One (1) package of chocolate chip cookies (for at least two cookies per student); toothpicks for each student; graph paper (or reproduce grid); glue (for restoration); balance sheet (for each student, reproduce)

Procedure
According to the Montana State Constitution, all disturbed lands must be reclaimed (see below).
ARTICLE II
DECLARATION OF RIGHTS
Section 3. Inalienable rights. All persons are born free and have certain inalienable rights. They include the right to a clean and healthful environment….

ARTICLE IX
ENVIRONMENT AND NATURAL RESOURCES
Section 2. Reclamation. (1) All lands disturbed by the taking of natural resources shall be reclaimed. The legislature shall provide effective requirements and standards for the reclamation of lands disturbed.

What is reclamation? How is it different than restoration?

Put simply, *reclamation* is the process by which a disturbed area is returned to its base-line, or minimum, functional requirement. An example of reclamation might be removing contaminants from soil.

Restoration goes one step further. This is the process by which an area is returned to a state that exceeds the minimum requirements. An example might be removing contaminants *and* planting native vegetation in order to return the area to its "natural" state.

Cookie mining is a way to illustrate the difference between these procedures.

Cookie Mining RECLAMATION

Step 1
Hand out graph paper and balance sheets to each student. Tell them that today they will purchase an area to mine. Hand out cookies and have students place them on their graph paper. Next tell them to trace their cookie.

Step 2
Ask students to view their balance sheets and deduct the cost of the cookie (land area) from their total. Hand out toothpicks and tell them that they must also deduct the cost of the tools.

Step 3
MINING! Students may only use their toothpicks (no hands!!) to mine for their chips. Allow 5 minutes maximum. Have students keep track of their time. Deduct the time (labor) from their total.

Step 4
Count the number of chips (broken ones count, but should be counted as fractions) and tally the result. Add this number to the total.

Step 5
Reclamation. Remind students that according to the State Constitution all disturbed lands must be reclaimed. Using only their toothpicks (no hands!!) have them return all of the crumbs to the area within their original cookie tracing (from step 1). Again, time the students and deduct this cost.

Step 6
Move cookie aside for later comparison.

Cookie Mining RESTORATION

**Repeat steps 1-4 of Cookie Mining Reclamation (above)*

Step 5
Restoration. During this step, students must not only return the crumbs to their original area, but must also try to return the cookie to its original shape. They may purchase glue from the teacher and may use their hands to help shape (but not to reclaim the crumbs; only use hands within the original square. Time the students once again and deduct this from their total.

Discussion
Which was easier or cheaper? Why would we want to restore an area if we only need to reclaim it? What are the benefits of restoration?

Assessment
Have students write a short description of their two cookies (i.e. "The reclaimed cookie is messier looking. The restored cookie looks more like a cookie") and ask them to write a definition of "reclamation" and "restoration" in their own words.

Reference: http://leg.state.mt.us/css/mtcode_const/const.asp

Results of the Fall 2005 Pilot Project:

As Project Coordinators, WEN will:

- Consult with Missoula area and Clark Fork River resource experts for high quality teaching tools for teaching local students about the Superfund process, remediation and restoration activities, with factual, accurate, up-to-date information.

- Feature resources available to the teachers for additional lessons on the Clark Fork River as extensions to the Pilot project and to provide additional educational resources and curriculum for the teachers and students. Examples: 1- *The Upper Clark Fork Teaching Trunk*, 2 – WEN's water monitoring program and equipment for additional study, and The Bonner-Milltown Redevelopment Working Group's plans and posters for community redevelopment.

- Serve as a catalyst for Missoula area teachers, by providing straightforward information and lessons, of the Clark Fork River remediation and restoration activities, responding to new information and changing conditions with the project. The Milltown Dam Education Pilot Project will provide the trial basis to ensure the quality and the direction for a long-term implementation of, and commitment to, the eventual, four-year *Milltown Dam Education Program.*

- Consult with the school teachers in the evaluation and revision of the Pilot Project curriculum and field trips to ensure that the Pilot Project meets educational standards

- Collaborate with NRDP staff, Missoula Water Quality Advisory Council, Milltown Redevelopment Group, Clark Fork Technical Advisory Committee, EPA, Clark Fork Watershed Education Project (CFWEP) and the Ramsey School Project in order to maximize resources and avoid duplication

- Evaluate the project, receiving feedback from teachers, students, and resource experts throughout the Pilot Project in order to shape a consistent, high-quality, four-year Milltown Dam Education Program

The intent of the Phase I Milltown Dam Pilot Project is to test the curriculum pieces and field trip experiences to evaluate what is best suited to implement in the four-year curriculum. The Pilot Project includes two major tasks:

(1) Compiling appropriate Superfund and Clark Fork River history, and the remediation and restoration timelines to provide clear and accurate presentations to Missoula's 8th grade classes: a) planning the details for the Pilot Project of this Phase I activity: b) creating pre and post - field trip tests; c) scheduling class presentations and field trips with 8th grade classes to the Milltown Dam site, with leadership provided by resource experts.

(2) Developing the specific curriculum concepts and field trip focuses that will be taught in the (Phase II) four-year *Milltown Dam Education Program*

b. Project phases

Phase I: Pilot Project August 2006 – July 2007

****September-November 2005 Activities sponsored by WEN***

August 2006 – July 2007
July 2006
1) Select four Missoula classes for participation in the Milltown Dam Pilot Project (MDPP);
2) Meet with agencies and resource experts to assist WEN in determining the Clark Fork River and Milltown Dam education outcome goals for the participating students and teachers;
3) Compile and create accurate, age-appropriate Milltown Dam and Clark Fork River curriculum to be presented to the participating eighth grade classes (2 lessons); develop a curriculum that follows dam removal remediation and river restoration activities;

August – November 2006
4) Create "Pre-tests" and Post -tests" to survey and test student knowledge before and after the MDPP
5) Administer the Milltown Dam pre-tests to the MDPP classes
6) Secure access for students and teachers to the Milltown Dam Superfund Site through appropriate key project officials and agency personnel
7) Coordinate and schedule field trips to Milltown Dam area with WEN staff, teachers, the bus company, and Milltown Dam resource experts
8) Facilitate Milltown Dam field trips (photo documentation, data collection, on site learning activities)

December 2006 – January 2007
9) Arrange for the classes to have a "Post-field trip" lesson (summary) and "Post-field trip" tests
11) Evaluate MDPP class presentation material and the field trip experience by sending detailed evaluation forms to teachers and resource experts
12) Evaluate overall effectiveness of MDPP; make any adjustments for spring Milltown Dam Pilot Project;
13) Begin draft the 2007-2011 *Milltown Dam Education Program* for the 2007 Natural Resource Damage Program Large Grant application

February - March 2007
Repeat the fall 2006 program, with recommended changes from evaluations –

1) Select 4 Missoula classes for participation in the Pilot Project
2) Meet with agencies and resource experts to assist WEN in determining the key Clark Fork River and Milltown Dam education outcome goals for the participating students and teachers;
3) Compile and create accurate, age-appropriate Milltown Dam and Clark Fork River curriculum to be presented to the participating eighth grade classes (2 lessons); develop a curriculum that follows dam removal remediation and river restoration activities; Determine the education outcome goals for the participating students and teachers
4) Create "Pre-tests and Post-tests for the participating students to survey and test student knowledge before and after the MDPP
5) Administer the Milltown Dam pre-tests to the MDPP classes

April – June 2007
6) Secure access for students and teachers to the Milltown Dam Superfund Site through appropriate key project officials and agency personnel
7) Coordinate and schedule field trips to Milltown Dam area with WEN staff, teachers, the bus company, and Milltown Dam resource experts
8) Facilitate Milltown Dam field trips (photo documentation, data collection, on site learning activities)
9) Deliver "Post-field trip" lesson (summary) and "Post-field trip" tests
10) Evaluate MDPP through questionnaire to teachers and resource experts
11) Evaluate overall effectiveness of MDPP; make any adjustments for spring Milltown Dam Pilot Project;
13) Presentation with MDPP results to NRDP for 2007-2011 *Milltown Dam Education Program* for the 2007 Natural Resource Damage Program Large Grant application

14) Finalize all curriculum, field trip components from MDPP for integration into the *Milltown Dam Education Program*

*August 2007 would begin the Phase II – *The Milltown Dam Education Program*
*(**NRDP funds are for August 2006– July 2007 Phase I Activities)**

February 2006 (repeat tasks 1-12, subject to recommendations from evaluations)
September 2006 (repeat tasks 1-12, subject to recommendations from evaluations)
Using a place-based model, student will be encouraged to develop science fair and other school projects that can be shared with the community such as inquiry-based projects (using authentic research questions, initiated by the students, as the basis for class study).

This Pilot Project will be implemented and then evaluated; the evaluation results will shape the subsequent, four-year curriculum and program, Phase II *Milltown Dam Education Program that* will be implemented in the following years (2006-2010). A survey system will assess teacher and student knowledge of Milltown Dam's history and removal. Their results and feedback from resource experts will tailor the four-year program in Phase II to meet educational goals and community needs. The Phase II *Milltown Dam Education Program* is intended to provide teachers and students the support needed to follow the Milltown Dam removal and restoration process.

The Phase II *Milltown Dam Education Program* will provide: a) teacher training including the Clark Fork basin and Milltown Dam history, removal plans, and restoration activities; b)

productive class presentations and lesson plans teaching specific concepts of the Milltown Dam history, Superfund process, and Milltown Dam removal and restoration plans. c) Student field trips planned with resource experts to follow the process of the Milltown Dam removal and Restoration process; d) Community celebrations featuring student presentations.

Funding for this Pilot Project would enable WEN to collaborate with teachers and resource experts to build a foundation for the *Milltown Dam Education Program,* test the curriculum and lessons we compile, gain a clear understanding of what the teachers and students needs are, and to tailor the *Education Program* to meet those specific needs.

Phase II: Milltown Dam Education Program
Implementation *August 2007-July 2011*

We are not currently seeking funding for Phase II of this project. However, an outline of the Education Program is provided in Appendix A1.

---

c. Identify the project staff for the particular tasks and quantify the staffing time necessary to complete the project.

Project Staff, Watershed Education Network

1. Deb Fassnacht, Executive Director, Watershed Education Network, 1999-2005

Deb will take responsibility for grant administration of the NRDP grant including: application, timeline, and budgets, supervising personnel, facilitating the Missoula School teacher participation, developing Clark Fork River and Milltown Dam Education curriculum, researching and securing appropriate resource experts, making class presentations, leading field trips, and communicating with agencies associated with the Milltown Dam Education Project.

Staffing time: (10hrs./week) -40 hrs/mo x $20./hr. x12 months = $9,600

2. Sean Sullivan, Field Program Director, Watershed Education Network, 2001-2005
Sean will be responsible for training the teachers and volunteers in the water monitoring protocols; development and implementation of class presentations at Missoula School, organize and facilitate all fieldtrips, recruit and coordinate resource professionals, and provide follow-up class discussions for data interpretation and analysis.

Staffing time: (15hrs/week) - 60 hrs./month x $16/hr. x 9months =$8,640

3. University of Montana Student Intern, Andrew Erickson, Watershed Education Network, dedicated volunteer 2000 – 2005

Andrew, as a volunteer intern will provide a minimum of 400 hours to the Milltown Dam Educational Project, primarily on field trips. Andy has been assisting the field water monitoring program seasonally for four years and brings his enthusiasm and expertise to the school field trips.

In-Kind Match *Staffing time: 18 hrs/week - 72 hrs/month x $12/hr. x 8 months = $6,912.*

d. Identify the contracted services necessary to complete the project.

Brooke Hewes, website design and maintenance contractor, (2003-2005); Brooke will maintain and continue updating the WEN website to reflect the progress of this project. She will be instrumental in making the survey available on-line, posting survey results, posting water monitoring data, and documenting teacher training and student field trips. This website maintenance is an integral piece of the community education and making the information available and accessible as possible.

Contractor time: 10 hrs/month x 4 months (every 2 months during the project) x $20./hr = $800.

e. Identify any permits, regulatory approvals or property access agreements that will be needed to complete the project.

We will need to obtain permission from Northwestern Energy and the private landowner for Missoula School field trips to take place on the bluff overlooking the Milltown Dam site. We have talked with Russ Forba and Dianna Hammer of EPA for assistance with the access of the site. There are public access sites we are able to use without gaining permission, at the Milltown Reservoir and at the fishing access area directly below the Milltown Dam. Future access near the Milltown Dam will likely require Envirocon and BP-Arco permission.

f. Describe the measures that will be undertaken to ensure long-term effectiveness.
The enthusiasm and positive experiences the Pilot Project teachers and students have for following the Milltown Dam restoration process will keep the Clark Fork River restoration topic alive and well in education communities as well as general public. Outreach to the Missoula area schools, especially the teacher training, provide for a long-term investment the lessons and the importance of future stewardship for the Clark Fork River and surrounding communities. The Milltown Dam Pilot Project will ensure continuing education programs about Milltown Dam and the Clark Fork River's Remedy, remediation and restoration successes into the future. We will maximize the long-term effectiveness by engaging the Missoula area school administration and teachers, Friends of Two Rivers, the Milltown Redevelopment Working Group, and Missoula City and County officials, and our community partners in the process.

D. Provide a Project Time Schedule.

Phase I - Milltown Dam Pilot Project – Aug. 2006 – July 2007

	Fall 2006						Winter - Spring 2007							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	July	Aug
Phase I Pilot Project														
Select 4 eighth grade classes	X	X						X	X					
Meet with Agencies and experts to set education. goals	X	X					X	X						
Compile and create curriculum	X	X					X	X						
Develop field trip concepts and activities	X	X					X	X						
Create Pre and Post tests to gauge	X	X					X	X						

knowledge														
Administer the pre-test to students			X						X					
Secure access to Milltown site			X						X					
Coordinate and schedule class presentations and Milltown fieldtrips			X						X					
Facilitate Milltown Dam fieldtrips			X	X	X				X	X	X			
Arrange Post- field trip lesson/post-test					X	X					X	X		
Evaluate Pilot Project					X	X					X	X		
Provide MDPP recommendations												X	X	
Draft Phase II – Milltown Education Program												X	X	
Implement Phase II														X

Phase II – Milltown Dam Education Program August 2007-July 2011

	Fall 2007					Winter - spring 2008							
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	July	Aug
Phase II Milltown Dam Education Prog.													
Select 6 eighth grade classes	X					X							
Meet with Agencies and experts to set education. goals	X					X							
Compile and create curriculum	X					X							
Develop field trip concepts and activities	X					X							
Create Pre and Post tests to gauge student knowledge	X					X							
Administer the pre-test to students		X					X						
Secure access to Milltown site	X	X				X	X						
Coordinate and schedule class presentations and Milltown fieldtrips		X					X						
Facilitate Class presentations and Milltown Dam fieldtrips		X	X	X			X	X	X				
Arrange Post- field trip lesson/post-test		X	X	X			X	X	X				
Evaluate MDE Project				X	X				X	X			
Make changes to MDEP as suggested				X	X				X	X			
Write reports and document progress					X						X		
Prepare for next school year MDEP												X	

Repeat for 3 additional years													

E. Describe Methods and Technical Feasibility of the Proposed Project.

1. Provide a detailed description of methods to be used to conduct specific tasks, including appropriate citations/documentation.

1**) Upper Clark Fork Teaching Trunk review** and determining specific lessons and activities to feature with the Milltown Dam Pilot Project. Use of existing materials and curriculum review for appropriate materials has been used effectively to teach natural resources topics. Examples of similar successful programs include: ***Project W.E.T.*** (Water Education for Teachers), a program of Montana Watercourse, Bozeman, Montana, as well as ***Project Learning Tree*** and ***Project Wild/ Project Aquatic.*** These educational programs use a class presentation with introductory concepts, followed by an activity that engages the students.

All have been using the model of teacher workshop trainings, with follow-up support as way to engage teachers in new activities. The workshop style encourages teachers to practice the concepts and activities to acquire background information and confidence in the topic - to put these concepts and activities into practice in the classrooms. Teacher evaluations from former workshops reflect the need to have materials taught through direct instruction and also through activities that provide practice time for the new skills and concepts. In the implementation phase, the Milltown Dam Education Program, teachers will receive training in the Milltown Dam concepts so the long-term effectiveness of the Milltown Dam and restoration topic is ensured. Teachers who received training are more likely to be invested in the topic of Clark Fork River and Milltown Dam history and have will engage their students in additional lessons, based on the teacher's received training new insights and experiences.

Place-based learning and providing ways for students to learn about the places they live first hand are becoming key educational experiences. Projects such as the Montana Heritage Project, encouraging inquiry-based (student-generated), "Journeys" sense-of-place projects for learning about local issues, and The Rural School and Community Trust, encouraging students to experience place-based learning projects, all support the idea of the Missoula-area students actively investigating and researching the Clark Fork River and Milltown Dam history.

2) Curriculum and lesson-plan review by teachers and resource professionals to ensure a high level of accuracy in the materials; engagement by experts and teachers in the concepts to teach students creates buy-in with the Pilot Project. New resources become available for teaching Clark Fork River and Milltown Dam history, and we will need resource experts to assist us by staying abreast of the Milltown reservoir clean-up Work Plan timeline. The teachers will be more willing to implement a program they helped develop. The teachers and the resource experts will help guide the class presentation materials and field trip topics. WEN's experiences facilitating the Upper Clark Fork Teaching Trunk curriculum development has given us experience in facilitating productive outcomes working with resource experts and teachers.

3) Field trips for observations and data collection are essential for connecting people of all ages with the specific place they are studying. Field trips provide an in depth, personal experience for people to have a direct experience with the place, first hand. WEN's experiences from the

summer week-long teacher tour, *The Clark Fork Watershed Expeditions for Teachers* (2001, 2002, and 2003) confirmed that the learning intensifies by being there and observing personally the place and the river systems. Our evaluations echoed that the value of "seeing, smelling, hearing, and feeling" the topic at hand were overwhelming positive and the participants retaining their knowledge from their direct experiences. The students in the watershed need to see the Milltown Dam and reservoir first hand as the Superfund clean-up process gets underway.

4) Surveys completed as "pre" (before) project assessment of knowledge and perceptions and again completed "post"(after) the pilot activities are one successful way to document the need for information about the topic and the specifics of what information to prioritize. Survey results will also show the success of the project or the need for additional pieces to the project. Surveys have been used extensively by universities, businesses and governmental agencies for developing and shaping the needs for a program and to determine the program's success.

2. Describe how this approach has been used successfully to address similar problems, if it has.

The Clark Fork Watershed Education Project and the Ramsey School project studying Ramsey Flats Superfund Clean-up are projects that use similar approaches to the problem of teaching local teachers and students about impacts to local rivers and Superfund clean-up occurring nearby. Other programs or projects that have used similar approaches of engaging teachers in training and first-hand experiences include: Project W.E.T., Project Wild, Project Learning Tree, Swan Ecosystem Center's Forestry Trunk, Fireworks Trunk, the JASON Project, Montana Natural History Center's Glacial Lake Missoula workshops, Upper Clark Fork Watershed Teaching Trunk; and WEN-Project WET summer Clark Fork Watershed Tours for Teachers.

3. What are the certainties and uncertainties associated with any innovative approaches to the proposed project?

We are certain that we will increase teachers' interest in local natural resources, by providing them with the specific curriculum, complied with local resource expertise (EPA, DEQ, NRDP, CFRTAC, WQD, FW&P, FOTR) focused on the Milltown Dam history, removal plans, and river restoration. We will be able to support teacher implementation of additional lesson plans in their class rooms. We can't be certain to what degree the teachers involved will use the materials and the amount of time they will devote to the Milltown topic in the scope of their school-year curriculum, but if we work closely with the Missoula-area teachers, surveying them and their students for progress, we will no doubt achieve good success. We are certain that students in the target schools will learn more about the Clark Fork River and Milltown Dam history from our Pilot Project than if we didn't provide the school program at all.

We are using proven educational approaches including the class presentations and field trips to Milltown Dam. There are a few uncertainties, however: 1) Possible time constraints from teachers for being able to schedule class presentations and field trips, given the schools' increasing pressures for student time; And 2) Will we be able to gain access from the appropriate officials for student group tours to the Milltown Dam and Milltown Reservoir sites?

4. Are there any uncertainties in the proposal that require further resolution? Please discuss these unknowns.

One uncertainty is the EPA and the associated Superfund responsible parties staying on the schedule set forth in the ROD. The legally binding Consent Decree is now finalized, and the Envirocon Work Plan and the timeline of activities is now set. We may need to adjust our time frames, based on any changes that take place through EPA and Envirocon's work schedule.

A second uncertainty is access (stated above). We are in contact with EPA regarding an eventual access easement on the property overlooking Milltown Dam (the bluff). We may need to adjust our fieldtrip locations based on access availability.

5. Are there any data gaps and how do you propose to address them?

As of now, we know of no data gaps with our project. We don't have any data that tells us we are duplicating any current educational efforts. Our teacher and administration surveys will inform us of any current topics related to Milltown are being taught already in Missoula-area schools.

6. Describe any potential complications and how they may affect the implementation time schedule.

Refer to question 4 (above). We anticipate minor changes in the time schedule to follow any changes in scheduling by the EPA, Envirocon, and other project entities.

In addition, we may make adjustments in our community outreach portions if the Friends of Two Rivers or the Milltown Redevelopment Working Group chooses to take on additional public education programs. We will certainly work in collaboration with any community education efforts.

F. Describe the Monitoring Plan.

1. Describe proposed monitoring activities.

Not applicable

2. Describe what monitoring data will be collected, why, how, and by whom.

The data that WEN will maintain are the results from pre-and post-tests for Missoula students that participate in the Milltown Dam Pilot Project. These tests results will determine the change in knowledge as a result of our project. We will also maintain the project evaluations received from the participating teachers and resource experts. The results of our tests and evaluations will shape the following *Milltown Dam Education Program.* WEN staff will deliver evaluations to teachers and resource professionals that participate in our Pilot Project; classroom teachers will likely administer both the pre and post-tests and evaluations.

Since the Milltown Dam Pilot Project follows the Milltown Dam removal and restoration activities, our survey data will provide information on the changing situation, therefore, the changing knowledge and understanding occurring with local students (and public) throughout the Milltown process.

3. Describe how problems will be addressed if monitoring indicates objectives are not being met.

Not Applicable

4. How does this monitoring effort consider or coordinate with other monitoring activities being conducted in the Upper Clark Fork River Basin?

WEN's Milltown Dam Pilot Project complements other monitoring activities in the Clark Fork Basin to enhance the comprehensive nature of the Upper Clark Fork River Basin knowledge and understanding. The Pilot Project will coordinate in particular with the Clark Fork Watershed Education Project (CFWEP), the Ramsey School Project, and the University of Montana's Center for Environmental Health SEPA grant in which WEN is developing high school student water science and water monitoring activities targeting the Milltown Dam and Clark Fork River. In addition, the various agencies involved in outreach/education about the Milltown Dam restoration process will be consulted with and invited to bring their expertise to this project.

G. Describe Qualifications of the Project Team

1. Deb Fassnacht, Executive Director, Watershed Education Network, 1999-2005;
Education and Experience: University of Montana, B.S. Forestry, Natural Resources and Conservation**,** Montana Teaching Certification - Secondary Sciences (grades 5-12) **,**graduate courses in communications and mediation**,** U. of M. School of Education Instructor, Elementary Science Methods (spring semester, 2002)**,** classroom teacher: 3 years with public schools, middle school sciences and language arts; 7 years with an alternative school - middle school sciences integrated curriculum K-1, 9-years community education coordinator –9 years, nonprofit organization work American Humanics *Nonprofit Administration* certification in progress; Montana Project W.E.T. Facilitator – 10 years; lead instructor for 2001, 2002, and 2003 Clark Fork Watershed Teacher Tours, Montana Education Association member (11 years) Montana Environmental Education Association member (14 years), CFWEP Leadership Team member (2006-2007) Examples of balanced, science education projects completed:

- Developed school-based water education and water monitoring program for WEN
- Contractor: Swan Ecosystem Center: Forest Stewardship Teaching Trunk (2001-02)
- Contractor: Montana Watercourse: Upper Clark Fork Teaching Trunk (2002-03)

*Deb Fassnacht's resume Appendix A2

Deb will be lead person from WEN taking responsibility for grant administration, overseeing the NRDP grant timeline, and budgets, supervising personnel, facilitating the Missoula School teacher workshop, developing Milltown Dam Education curriculum, researching and securing guest speakers, resource experts, communicating with the people and agencies associated with the Milltown Dam Education Project.

2. Sean Sullivan, Field Program Director, Watershed Education Network, 2001-2005;
Education and Experience: University of Montana, B.A. Environmental Studies with an emphasis in Water Resources***;*** Montana Water Trust (MWT): contracted services for assessment of stream geomorphology Rapid Biological Assessment (RBA), basic chemistry on Nine Mile Creek and O'Brien Creek in western Montana; measurements of in-stream flows to ensure protection of MWT's in-stream water rights; Internship: Missoula City-County Water Quality District: completed watershed condition report for Lolo Creek, Montana; designed and completed monitoring program for nutrient loading, biological assessment (RBA); Training: Rocky Mountain Watershed Network's Watershed Monitoring and Assessment Design (2004)
* Sean Sullivan's resume Appendix A3

Sean will be the lead Program Director responsible for training the teachers and volunteers in the water monitoring protocols; develop and implement class presentations at Missoula School, organize and facilitate all fieldtrips, recruit and coordinate resource professionals, and provide follow-up class discussions for data interpretation and analysis.

H. Provide Supporting Technical Documentation

1. Provide a list of references and literature citations pertinent to the project and the technical approach.

Not applicable

3. Provide maps or aerial photographs that show the project location. Include pertinent topographic and geographic information, scale, and north arrow.

*Map of area Appendix A5

Step 4. Criteria Statements

1. Relationship of Expected Costs to Expected Benefits:

Direct Costs:

- Milltown Dam Education Pilot Project total cost = $36,196
  Natural Resource Damage Program cost = $24,712
  In-kind Match contribution (costs) = $11,842

Direct Benefits:

- As previously stated, the Milltown Dam Pilot Project would benefit about 400 students in gaining knowledge about the Milltown Dam remedy and restoration activities the year of implementation, which in turn will impact 8-12 classroom teachers, and likely have spillover effects to family members and friends of the students with a rate of 2 adults impacted for every student participant
- The NRDP is getting nearly 1.5 total project value or 150% for their 100% funding of the Milltown Dam Education Pilot Project. The In-kind Match provided to the Pilot Project is a 32% (calculated with total project cost).
- Missoula-area school administration, staff, teachers and students all receive exposure to the concepts and topics of the Milltown Dam process, relative to the planning phase.
- Community members with contact with the school, or who are contacted for participating in the surveys will receive information and exposure to the Milltown Dam restoration process, which otherwise may not occur.
- The natural resources that have a direct benefit include:

  1) Stewardship for rivers and river ecosystems for the long-haul in the Clark Fork River basin. We are capitalizing on this unique, cleanup process scheduled for the Clark Fork river at Milltown to maximize awareness, knowledge, and citizens and people of Montana who have been affected by the natural resource damages and for the local students and communities to gain insight, information, and ownership in the clean-up and restoration of the Clark Fork River at Milltown Dam.
  2) The Clark Fork River and all the life that depends on it, our State fisheries and other wildlife dependent on a clean and thriving environment stand to gain a long-term benefit by people and land use decisions being more in-tune with a healthy natural environment

well into the future by learning and understanding the history and process of restoration of river systems now.

The highest direct and indirect benefit to the injured resources (the people of Montana and the Clark Fork River) is raising awareness and interest in the Milltown Dam restoration process. If the people of the area can fully understand the historical, economic, and social circumstances that led to the injuries in the Clark Fork Basin to begin with ---then, there is heritage and hope in the current restoration encouraging people in the Clark Fork Basin to continue stewardship of State rivers into the future.

Indirect Costs:

- Missoula-area school administrators, teachers, students, and community members contribute their time, experiences, and expertise to the project. This is an indirect cost to the project in the form of the surveys, the teacher planning sessions, the training workshops, and the field trips.
- Resource experts and WEN staff will also contribute time, equipment and resources (in-kind)
- WEN will ensure that the best use is made of in-kind donations of time and materials by resource professionals, teachers, and other agencies involved in the Pilot Project.

Indirect Benefits:

- There are intangible benefits resulting from inviting students participate in a survey of what they know about Milltown Dam and the removal process and finding out what information is crucial to developing a well-informed citizenry. Some of these benefits include students discussing with other people, the Milltown Dam restoration in their informal conversations and the general becoming more aware of the huge transition taking place at the Milltown Dam, in their community. The promotion we are likely to receive from local newspapers, television and radio may heighten the public awareness of the Milltown Dam restoration process.
- A renewed sense of "community" as a result of the people of the area uniting and communicating about their place, finding value in where they live, which will result in a renewed sense of community
- This renewed sense of community in return, fosters ownership by many people in the processes affecting their community and their surrounding environment
- Involvement by the community results in raising awareness and increasing stewardship of the natural resources.
- The restoration of the communities and people that reside near the Milltown Dam will be as crucial to the success of the Milltown Dam river restoration process as the state-of-the-art techniques the responsible parties employ to "restore the damaged resource".
- By involving the schools, teachers, and students (communities too) in the Superfund process and river restoration, the people most affected will become very interested and stay involved in the process, carrying the long-term care of the resource forward.

3. Cost Effectiveness:

Alternatives to the proposed project:

1) Wait for someone else to come up with the idea, but likely too late to encompass the whole Clark Fork River and Milltown Dam restoration process:

- Wait for the Friends of Two Rivers to come up with a Missoula-Area School Education Plan
- Wait for the CFWEP to expand their education programs to Missoula schools (2009)

2) Missoula-area schools add the Milltown Dam and Clark Fork River restoration to their science curriculum
3) A community entity decides to provide a Clark Fork River and Milltown Dam restoration education program
6) No Action

In considering the alternatives, none would be able to meet the need for education in a timely manner for students and the community. The essential justification for our project is timing. The Milltown Dam removal process is slated to begin in early 2006. In order to involve the Missoula –area school teachers, students and the community in all phases of the process, timing is crucial. Aside from timing, a complete and balanced education program with dedicated community involvement can not be necessarily achieved with any of the other alternatives. Our proposed project is the only alternative to capture the moment in time to best make the entire Milltown Dam and river restoration process one to learn from beginning to end.

WEN's experience with teacher training workshops, water monitoring protocols, Clark Fork Watershed Expeditions for teachers gives us a strong foundation to offer a balanced and comprehensive approach to natural resource topics. We have worked for nine years to develop a relationship with teachers and schools and a reputation for providing science-based, factual information on natural resource concepts. We also regularly consult resource experts to provide the specific technical topics that they cover most accurately.

4. Impacts to the Environment and Human Health and Safety:

1) This project has potentially small, localized impacts to the environment with groups of students walking and sitting at the Milltown site, there is potential to trample the vegetation in the area; we will take precautions, such as staying on trails and areas of obvious human use to minimize our impacts to the site.
2) There is also a slight risk to human health by exposing the students to contaminated sediments at the Milltown Dam site, but again, we will caution our resource experts and field trip participants to take safety precautions to reduce any chance of people handling the sediments.
3) An additional potential risk to human health and safety does exist in the teacher and student field trips to the Milltown Dam reservoir (with arsenic-laden sediments); mild safety concern when collecting data with Missoula-area students below the dam where the water can be moving fast. These are both short-term risks that will be minimized by taking all logical precautions to prevent teachers and students from having contact with the contaminated sediments, and keeping students safe distances from dangerous, moving water.
4) If we can not protect students from the above risks during our field trips, we will seek reasonable alternatives for observing the Milltown Dam site and collecting data.

5. Public Support:

- WEN has sought public support in the form of letters of support from the following groups:

1) The Missoula School administration, Doug Ardiana, Superintendent and science teacher, Sean Kiffe
2) The Friends of Two Rivers (FOTR), members, Judy and Gary Matson
3) The Milltown Redevelopment Group, project leader, Peter Nielsen Missoula Water Quality District Supervisor
4) The Clark Fork Watershed Education Project (CFWEP), Colleen Elliot
5) Washington Middle School teacher, Teresa Toller

6. <u>Public Access</u>:

Not applicable

5. Project Proposal Budget	**Milltown Dam Education Project**					
EXPENSE CATEGORY	**UCFRB RESTORATION FUND**	**APPLICANT CONTRIBUTION**		**OUTSIDE SOURCES[1]**		**TOTAL**
	$17,280	**Cash**	**In-Kind**	**Cash**	**In-Kind**	$24,192
1. SALARIES AND WAGES			$ 6,912			
2. FRINGE BENEFITS	$2,592 ($19,872 – subtotal)		$300			$2,892
3. CONTRACTED SERVICES	$800		$400			$1,200
4. SUPPLIES AND MATERIALS	$600		$300			$ 900
5. COMMUNICATIONS	$1,200		$400			$1,600
6. TRAVEL	$360		$222			$ 582
7. RENT AND UTILITIES	$1,730				$1,648	$3,378
8. EQUIPMENT	0		$1,200			$1,200
9. MISCELLANEOUS	$150		$100			$250
TOTAL $	$24,714		$9,834		$1,648	$36,196

[1] Clearly indicate the outside sources of funds and what funds are in-kind or cash match.

Milltown Dam Education Pilot Project

Proposed Budget Notes:

Salaries and Benefits

Salary
1- Part-time Program Coordinator
@ 15 hrs/week – 60 hrs/month x $16/hr
=$960./month for 8 months = **$7,680.**

Benefits for ½ time Program Coordinator:
15% x $7,860 = $1,152.
Program Coordinator Salary and Benefits = *$8,832.*

Salary
1- Part time Director
@ 15 hrours/week – 60 hrs/month x $20.hr
=1,200/month x 8 months = **$9,600.**

Salary Total ***$17,280***

Benefits for approx. 1/2 time Director:
15% x 9,600.= $1,440.
Director Salary and Benefits = *$11,040.*

Benefits Total ***$ 2,592***

In-Kind Match: University of Montana Intern, 18 hrs.wk – 72 hrs/month- @576 hrs. x $12/hr= $6,912. *$6,912.*

Total Salaries and Benefits = **$ 19,872.**

Contracted Services
Webmaster, Brooke Hewes: website updates and maintenance:
(10 hrs/month every other month) 40 hrs x $20./hr = **$ 800.**

In-Kind Match: website time volunteered for the project *$ 400.*

Supplies and Materials:
Teacher supplies ($300); student field trip supplies($300): **$ 600.**

In-Kind Match: WEN's office as meeting space = *$300.* *Sessions ($50./hr x 6 hrs =$300.)*

Communication:
Printing surveys ($300)
Mailing correspondence, community surveys ($300) . Teacher Stipends for meetings (3 teachers x $200) = $600 **$ 1,200**

In-kind match of printing discount for surveys, teacher lesson plans, data sheets, and student field notebooks by printing business *$ 400.*

Occupancy Expenses

Rent and Utilities of WEN office for (.5) x 8 months **$ 1,730.**

In-kind match with balance of rent and utilities paid through other grants (includes renter's insurance for equipment and supplies)	*$1,648.*

Equipment

In-kind match of WEN's field equipment for stream monitoring: Waders, test kits, all physical equipment, Including GPS, camera, stop watches, transparency tubes and stadia rods for teacher training, and student field trips	*$1,200.*

Transportation **$ 360.**

Primarily used for driving to field trip sites and conferences
Travel/Transportation (500 miles/yr. x 2 people =$360.)
(in-state miles reimbursed at .36/mile)

In-Kind Match: volunteer use of vehicles for Milltown project (4 volunteers@ $50.ea reimbursement for the year-long project)	*$222.*

Miscellaneous

Teachers/Resource experts meetings $ 150.

In-kind match of WEN's contributions to teacher/resource experts	*$100.*

Total Direct Costs **$24,714.**

NRDP funds requested

Total In-Kind Match Amounts ***$11,482.***

Total Project Budget **$36,196.**

Milltown Dam Education Pilot Project

List of Attachments

A1. Project Implementation Outline (2006-2010)
A2. Deb Fassnacht resume
A3. Sean Sullivan resume
A4. Milltown Redevelopment Newsletter - winter 2004/2005
A5. Map of Milltown Dam area
A6 –A7 Letters of Support

Appendix A1

Phase II: Milltown Dam Education Program (Implementation)

December 2006- July 2010

*Note: Watershed Education Network (WEN) is not currently seeking funding for Phase II: Milltown Dam Education Program – the long term objective of the current Pilot Project. The outline of Phase II is provided for reference:

Specific lessons and activities for the four-year student curriculum will be tailored by experiences and feedback from the Pilot Project (Phase I) WEN will use all evaluation results to meet specific education goals and community outreach needs. WEN staff, resource professionals, and teachers will continue the comprehensive study of Milltown Dam removal and Clark Fork River restoration activities initiated in the Pilot Project by:
(1) Instructing class presentations to Missoula-area High School classes;
(2) Facilitating field trips to the Milltown Dam site for participating classes;
(3) Following the Milltown Dam removal and river restoration process through continuous progress updates from key agency personnel(EPA), Clark Fork Technical Advisory Committee (CFRTAC), University of Montana's Center for Riverine Science;
4) Enhancement of understanding of the Milltown Dam restoration complexities through presentations by professionals from Missoula Water Quality District; EPA, critical agencies, and involved citizens.

The Milltown Dam Education Program will follow the removal and restoration timeline for the Milltown Dam Superfund and State of Montana remediation and restoration activities set forth in the 2005 EPA Record of Decision. Watershed Education Network (WEN) will facilitate the participation of eight high school classes per year in the Education Program from 2006 – 2010. Specifically, WEN will:

- **Invite 12-14 teachers** from Missoula-area high school to the Milltown Dam Education Teacher Workshop – including on-site field trips (August each year);
- **Facilitate participation by 4-6 high school classes** each season (fall/spring) in the Milltown Dam Education Program
- **Instruct 2 Presentations** to each class; one prior to the Milltown Dam restoration field trip; one presentation after the class has participated in the field trip, lessons, and activities in the Upper Clark Fork Teaching Trunk;
- **Guide** the science students interested in their own inquiry-based projects that incorporate river monitoring activities.
- **Provide** data collection during all phases of dam removal and river restoration processes
- **Promote** student projects through public relations and opportunities to share their studies at their schools and community events (Science Fairs, Science Olympiads)
- **Facilitate** community outreach by making the Milltown Dam Education Program results and observations available for sharing at community-focused events such as the Annual Clark Fork Watershed Festival. RiverFest, Clark Fork Clean-up, and Milltown community events sponsored by the Milltown Redevelopment Working Group, Clark Fork Technical Advisory Committee public events, and possibly a Milltown Celebration.

Phase II: Milltown Dam Education Program Timeline

Year 1

Nov. 2006 – July 2007

Spring

1) Review and implement all recommendations from the Pilot Project for shaping the Education Program (Nov.-Jan.)
2) Develop the contents for the Milltown Dam Education Program Teacher Workshop (Jan.-Feb)
3) Recruit 12-14 high school teachers for participation in teacher workshop (Feb.-March)
4) Implement teacher workshop (March)
5) Recruit 4-6 high school classes, schedule field trips, arrange buses, schedule resource experts (March –April)
6) Implement Milltown Dam Education Program: class presentations, field trips, lessons and activities for each class (April-May -June)
7) Compile survey results and summarize teacher, student, and resource expert evaluations
(June-July)
8) Documentation and reporting (July)

July 2007 – Dec. 2007

Fall

1) Based on evaluations, develop the contents for the Milltown Dam Education Program Teacher Workshop (July)
2) Recruit 12-14 high school teachers for participation in teacher workshop (July-Aug)
3) Implement teacher workshop (Aug)
4) Recruit 4-6 high school classes, schedule field trips, arrange buses, schedule resource experts (Aug.-Sept)
5) Implement Milltown Dam Education Program: class presentations, field trips, lessons and activities for each class (Sept. Oct. Nov.)
6) Compile survey results and summarize teacher, student, and resource expert evaluations
(Nov.-Dec.)
7) Documentation and reporting (Dec.)

Year 2

Jan. 2008 – July 2008

Spring

1) Based on evaluations, develop the contents for the Milltown Dam Education Program Teacher Workshop (Jan.)
2) Recruit 12-14 high school teachers for participation in teacher workshop (Feb.-March)
3) Implement teacher workshop (March)
4) Recruit 4-6 high school classes, schedule field trips, arrange buses, schedule resource experts (March –April)

5) Implement Milltown Dam Education Program: class presentations, field trips, lessons and activities for each class (April-May -June)
6) Compile survey results and summarize teacher, student, and resource expert evaluations
(June-July)
7) Documentation and reporting (July)

July 2008 –Dec. 2008

Fall

1) Based on evaluations, develop the contents for the Milltown Dam Education Program Teacher Workshop (July)
2) Recruit 12-14 high school teachers for participation in teacher workshop (July-Aug)
3) Implement teacher workshop (Aug)
4) Recruit 4-6 high school classes, schedule field trips, arrange buses, schedule resource experts (Aug.-Sept)
5) Implement Milltown Dam Education Program: class presentations, field trips, lessons and activities for each class (Sept. Oct. Nov.)
6) Compile survey results and summarize teacher, student, and resource expert evaluations
(Nov.-Dec.)
7) Documentation and reporting (Dec.)

Year 3

Jan. 2009 – July 2009

Spring

July 2009 – Dec. 2009

Fall

(Make recommended changes; repeat year 2)

Year 4

Jan. 2010 – July 2010

Spring

(Make recommended changes; repeat year 2)

Provide for community outreach

Debbie Bergman Fassnacht
1118 Creek Crossing Road
Missoula MT. 59802
(406) 721-5805; Email: watershedednet@aol.com

WORK EXPERIENCE

1/96- present: **Watershed Education Network, Missoula;** *Executive Director (since 1999)*
5/04-2/05: **University of Montana, Missoula**
Outreach Coordinator, National Science Foundation- EPSCoR Program
5/03 - 8/03: **Upward Bound, University of Montana;** *Environmental Science Instructor*
11/00- present: **Education Dynamics;** *founded a consulting business focused on curriculum*
1/02 - 6/02: **University of Montana, School of Education, Missoula**
Instructor: C&I 311: Teaching Science in Elementary Schools
1/01-12/02: **Swan Ecosystem Center, Condon, Montana**
Forest Stewardship Educational Trunk Project Director

2001, '02;'03: **Montana Watercourse, Bozeman, Montana**
Project Director and Instructor: Summer Clark Fork Watershed Tour
1999-2000: **The Missoula Ravalli Transportation Association, Missoula**
School Programs Coordinator
12/98-8/00: **International Wildlife Film Festival, Missoula -** *Education Program Coordinator*
1995-1998: **Missoula Valley Water Quality District, Missoula -** *Community Education Specialist*
*1995-2000***: Montana Natural History Center, Missoula** *- Instructor, Summer Outdoor Science*
*1989-1995***: Sussex Alternative School, Missoula** *- Teacher*
1987-1989: **Seeley Lake Elementary School, Seeley Lake -** *Teacher*

EDUCATION

1976-1980 B. S. Forestry: Natural Resources Management and Conservation; University of Montana
1983-1984 Teacher Certification, General Sciences (grades 5-12); University of Montana
1995-1998 Communications Studies graduate courses; *Quantitative Analysis; Mediation*
2005 American Humanics, Nonprofit Administration course: *Advanced Nonprofit Management*

RELATED EXPERIENCE

1992 - 1998 Montana Environmental Education Association: Board of Directors, Region 2 from 1992-1994.
1994 -2004 Clark Fork Watershed Festival; developed and facilitated an active water education station
2002 – Isaac Walton League and EPA Wetlands Education Conference; Orlando, Florida
2003 – River Network's annual River Rally; Stevens, Washington
1995 -1998 Missoula Water Partnership; facilitated community forum for water issues
1995 - 2002 Hellgate High School S.A.V.E. Club (Students against Violating the Environment)
2002 – 2003 Ecology Project International Volunteer

REFERENCES

Dr. Vicki Watson, **Professor Environmental Studies EVST and Botany**; University of Montana
Missoula, MT. 59812; (406) 243- 5159; Email: txtrky@selway.umt.edu
Karen Filipovich, Director, Montana Watercourse, Montana State University**,** 201 Culbertson Hall
P.O. Box 170575, Bozeman, MT. 59717-0575; (406) 994-1910; Email: kfilipovich@montana.edu
Brad Robinson, Membership Director, Montana Nonprofit Association, P.O. Box 1744, Helena, MT. 59624 (406) 449-3717; Email: brad@mtnonprofit.org
Anne Dahl, Executive Director Swan Ecosystem Center, Hwy 83, Condon Work Center**,** Condon, MT.
(406) 754-3137, Email: swanec@blackfoot.net
Anita Maxwell, Program Director, Montana Natural History Center, 120 Hickory St., Missoula, MT. 59801; (406) 327-0405; Email: anitam@thenaturecenter.org

Sean Sullivan
227 Connell Street Apt #1, Missoula, MT. 59801
Ph. (406) 531-2382; Email: Sean@montanawatershed.org

Education:

B.A. Environmental Studies –emphasis: Water Resources. University of Montana, 2003

Certifications:

Rescue Three International: Swift Water First Responder
Aerie School of Backcountry Medicine: Wilderness First Aide
PSIA: Telemark Ski Instructor

Employment History:

- **Watershed Education Network**; **Field Program Director;** 2001-present
  315 South Forth East suite 203 (406)541-9287 www.montanawatershed.org
  Duties include: recruitment and training of volunteers for a fall/spring stream monitoring education program. Tasks include: seasonal coordination of stream field trips for 16 middle school classes and curriculum development for grades 5-12.; development and supervision of high school Flagship program for stream projects; developed volunteer stream monitoring program in Western Montana "Stream Team"; designed a Stream Monitoring Training Video
- **Montana Water Trust; Contracted Service Provider;** Summer 2004- present,218 South 6th Street East, Missoula, MT 59801; (406) 721-0476; Email: info@montanawatertrust.org; www.montanawatertrust.org; Assessment of stream Geomorphology, Rapid Bio Assessment, Basic Chemistry on Nine -Mile Creek and O'Brien Creek in Western Montana and measurement of in-stream flows to ensure protection of MWT's in-stream water rights
- **The Trail Head, Inc.;** 2000-2004; Title: Floor Staff

Internships:

Missoula City-County Water Quality District, 2002-2003;
Hired by the Water Quality District to complete a watershed condition report for Lolo Creek, Montana. Designed and completed monitoring program for nutrient loading, biological assessment(RBA) and physical characterization as part of a pre-TMDL study on Lolo Creek
University of Montana Watershed Health Clinic, 2001-2003; Title: Field Assistant
Assisted with the completion of a wide range of data-based projects including habitat assessments in Deer Lodge, Rock Creek, and the Bitterroot Valley and nutrient loading of the Upper Clark Fork and Bitterroot Rivers.

Conferences and Workshops:

- Rocky Mountain Watershed Network: Monitoring Design and Data Interpretation Training, Boulder, Colorado
- Clark Fork Watershed Symposium (2001, 2003, 2005), University of Montana

- Lower Clark Fork Water Monitoring Group; presented and provided volunteer water monitoring training for volunteer water monitoring training for the teachers and Green Mountain Conservation District
- Montana Watercourse's Water Summit; presented and provided training for water monitoring data to be entered into the STORET database
- Montana Environmental Education Association, conference attendance (2003, 2004, 2005)

References:

Chris Corbin - Director, Montana Water Trust, 721-0476; info@montanawatertrust.org
Deb Fassnacht - Executive Director Watershed Education Network, 541-9287 deb@montanawatershed.org
Dr.Vicki Watson - Professor, University of Montana Environmental Studies, 243-5153 v.watson@umontana.edu